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State of Oregon
Department of Environmental Quality

Memorandum

Date: March 11, 1996

To: McCormick & Baxter Project File

From: Bruce Gilles, Project Manager *BAG*

Subject: Evaluation of Field Screening Data Used to Derive Remedial Action Levels for Treatment of Soil

Background.

DEQ and its contractor, Ecology & Environment, Inc. completed an evaluation of the field screening data for polycyclic aromatic hydrocarbons (PAHs), pentachlorophenol (PCP) and metals (arsenic, chromium, copper and zinc) collected during the summer of 1994 to characterize the extent of surface soil contamination at the McCormick & Baxter Creosoting Site. Composite samples from 651 locations along a pre-established grid on 50 foot centers were collected and analyzed for site related contaminants using thin-layer chromatography (TLC) for PAHs and PCP, and x-ray fluorescence (XRF) for metals. A subset of the field screening samples were also submitted to a commercial laboratory for semivolatile organic compound analysis (EPA Method 8270) and metals analysis (EPA Method 6000/7000). A total of 24 samples were analyzed for semivolatile compounds and 10 samples for metals. This data was used to identify areas for expedited soil removal actions taken prior to and during plant demolition activities.

PTI, DEQ's contractor for the RI/FS and interim remedial measures through November 1995, utilized the field screening data to derive soil volume vs. concentration curves in the Revised FS, dated September 1995. These volume vs. contaminant concentration correlations were used to derive remedial action levels where treatment would be cost effective. Appendix A of the Revised FS presented the soil volume vs. concentration analyses used to derive remedial action levels for total PAHs (500 mg/kg), PCP (500 mg/kg), and arsenic (300 mg/kg). These concentrations were ultimately used in the FS for all soil alternatives where treatment and/or consolidation was a component, including DEQ's proposed remedial alternative for soil (Alternative 5B).

DEQ provided comments on the draft revised FS, dated April 1995, that there appeared to be a bias between the field screening results and the laboratory results (see DEQ comments dated May 22, 1995). PTI performed additional evaluation of the field and laboratory data shown in Figures A-5 through A-8 of the Revised FS. Their conclusions are summarized in Appendix A on Pages A-3 and A-4 under the section titled *Applicability of TLC Method*.

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Independent Evaluation

TLC Results for PAHs & PCP

Of the 24 split samples submitted for laboratory confirmatory analyses, the results from 16 samples were "non-detects" for PAHs and PCP with approximately 35% false positives being reported for field vs. laboratory results. Due to the limited number of laboratory and field screening data with detected concentrations, valid statistical correlations cannot be developed. To develop statistical correlations in the FS, PTI utilized all 24 samples and summed the detection limits for all PAH constituents for the 16 samples with non-detect results. PTI concluded from this analysis that there was an acceptable linear relationship between TCL and Method 8270 results. This analysis is not statistically valid. If it were, the key parameter of interest for the linear relationship would be the slope which would reflect the bias between laboratory and field screening data.

Of the remaining 8 samples with detected concentrations in laboratory analyses, visual inspection indicates a consistent overestimation of concentrations from field screening data as compared to laboratory results. The field screening results are biased by approximately +50% from laboratory results.

XRF Results for Arsenic

XRF field screening methods were generally effective in detecting elevated concentrations of arsenic, copper and zinc in soil, however, XRF consistently overestimated the concentrations of these metals. The overestimation or bias (approximately 25%) in the field screening results is not as significant as the case with TLC results for PAHs and PCP (50% or more). Due to the high percentage of undetects (60%) in field screening samples, XRF results for chromium were inconclusive. However, chromium is not a significant contaminant of concern for treatment of surface soils.

RE-EVALUATION OF ACTION LEVELS

Re-evaluation of action levels for arsenic are not warranted due to the bias between XRF and laboratory results. The actual volumes exceeding the remedial action level for arsenic (300 mg/kg) may be several thousand cubic yards less than the estimated volumes in the FS.

DEQ, in response to public comments on the proposed plan concerning the "risk level" associated with total PAHs at the 500 mg/kg remedial action level, has revised the remedial action level to 100 mg/kg carcinogenic PAHs (CPAHs) using the carcinogenic slope factor for benzo(a)pyrene. DEQ has re-evaluated the volume estimates for soil exceeding the 100

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mg/kg remedial action level for CPAHs. The results of this evaluation is summarized below.

Volumes Related to Field vs. Laboratory Data Estimates

PAHs

Soil volumes above the remedial action level for treatment may be reduced by at least 2,700 cubic yards (see Table A-3 from Revised FS), if it is assumed that field screening PAH results overestimate actual concentrations (i.e. laboratory data) by approximately 50% resulting in a total volume of approximately 11,800 cubic yards.

DEQ evaluated the carcinogenic PAH (CPAH) concentrations vs. total PAH concentrations (sum of low molecular weight PAHs [LPAH] and high molecular weight PAHs [HPAH]) from the RI surface soil sample results (see Table H-2 in Volume IV of RI Report). Visual inspection indicates that CPAH concentrations are in almost all circumstances less than 50% of the total PAH concentrations. A conservative estimate of the CPAH concentration at a 500 mg/kg TLC PAH concentration is estimated at:

$$(0.5 * 0.5) * 500 \text{ PAH by TLC} = 125 \text{ mg/kg CPAH.}$$

Revising the remedial action level for PAHs to 100 mg/kg CPAH, might off-set the 2700 cubic yard overestimate of soil volumes using TLC field screening results for PAHs.

Summary & Conclusions

The estimated volumes of soil to be treated by biological methods in the land treatment cell are conservatively estimated to be approximately 15,000 cubic yards which is within 30% of the 17,450 cubic yards estimated in the FS using field screening data.

The estimated volume for metals contamination (12,500 cubic yards) is likely overestimated by more than 30% primarily due to the assumed 1 foot depth interval used for the volume calculations. The XRF bias has little affect in the volume estimate as compared to the thickness estimate. The overestimation in soil volumes was clearly discussed in the Revised FS issued for public comment.

To conclude, the change in the action level for PAHs will not increase soil volumes to be treated. Volumes will likely be less than estimated in the FS using field screening data. Metals only contaminated soils are likely greater than 30% less than estimates in the FS, however, these uncertainties were clearly discussed in the FS. Therefore, no revisions to the cost estimates or volumes identified in the ROD are warranted.